

Illinois 53 project in Will County

Years in the Making, Days in the Paving

By Randell Riley, P.E.

"It usually takes 20 years to become an overnight success!"

--Anonymous

Sound familiar? You have probably heard the phrase or something similar. I am reminded of this little bit of wit now that the industry finally gets to see an Illinois Department of Transportation Ultra-thin Whitetopping project on the scale of the most current IL 53 project in Will County. From my point of view this project was 20 years in the making!

The project is the biggest of its type that has actually been let on a state highway in Illinois. Though some of our county jobs come close to matching it in sheer volume, none come close to the volume of concrete that actually got placed on northbound IL 53 the week of May 21st. The pace of the operation was astounding.

According to IRMCA Member Justin Ozinga of Ozinga Ready Mix, the company supplying the concrete, approximately 7400 cubic yards went out the gate at their plant located in Vulcan's quarry off of Laraway Road just south of Joliet. And this happened between roughly Monday morning and Friday afternoon of that same week.

D Construction, Inc., an Illinois Chapter, Inc.—American Concrete Pavement Association contractor member, placed approximately 61,000 square yards, just slightly more than 4 miles of 4-lane, 4-inch minimum thickness, 4-foot x 4-foot joint spacing concrete pavement containing 4 lbs./cu. yd. of Grace Construction Products Strux 90/40 synthetic structural fibers in a single 24 feet wide pass.

A number of factors contributed to the rapid execution of the project. Since it was an overlay project, and by its very nature a synthetic structural fiber reinforced system, it contains no steel. D's crews could pick up concrete at Ozinga's central mix plant in end dumps and discharge directly in front of the paver. There were no dowel baskets to worry about that had to be pinned to the grade. Just place the concrete and pave. But that is not all.

D Construction opted to use its Leica Geosystems 3D stringless system for paving. For a paving engineer who has tripped over his share of stringlines over the years and is forever worrying about tripping over his next one, this was nothing short of revolutionary! It speeds up delivery, makes finishing easier and in theory can build an even smoother product due to the tighter potential control compared to stringlines. Though there is some up front survey work that has to be done and some computer modeling to correct grades, there no longer is a crew staking the project, setting up the stringline and eyeballing to make sure there are a minimum of bumps and dips.

Though this project is commonly referred to as Ultra-thin Whitetopping, in more current jargon it is actually a bonded concrete overlay system on asphalt. The existing asphalt overlays of the old U.S. 66 alignment were milled to create what would be more correctly called an inlay. This is a true concrete "mill and fill" project and the first of its kind in Illinois on this scale.

Success of the project requires that the bond be maintained. No dried loose material is permitted on the milled asphalt that is likely to inhibit bond. A simple test of adequate cleanliness is to stick duct tape to the dry surface and then release it. If the duct tape comes up dirty the pavement needs to be blown clear with compressed air to make sure there is no sand residue. Mud would be required to be removed and the surface cleaned to ensure that the new concrete layer would stick. Also, no standing water puddles can remain as that too would inhibit bond. As temperatures rise, the asphalt may be misted or lightly sprinkled to aid in cooling the surface through evaporative cooling as long as no standing water remains.

Paving operations were fast and effective owing to the GOMACO GHP 2800 slipform paver. As usual with most projects of this type, there are initial concerns about the paver being able to manage the structural fibers that are intermixed with the concrete. Those concerns were largely over within the first two to three truck loads. Once vibrators hit the concrete it consolidates readily. Minimal balling of the fibers occurred initially and those were totally eliminated the second day with the addition of 15 seconds of mix time at the central mix plant and a little more manual effort in dispersing the fibers at the time of addition at the plant.

Finishing of the pavement was done with traditional hand finishing methods and

Ozinga's central mix concrete plant batched 10 cubic yards at a time throughout the course of the project.

D Construction's GOMACO GHP 2800 goes through a lot of concrete very fast when paving 24-feet wide and only 4-inches thick. Paving proved to be easy for this type of equipment. The apparent stiffness of the concrete in front of the paver due to the fibers is not a factor once the vibrators hit the concrete and it becomes fluid.

Hand tining of the surface was accomplished behind the paver. Though the surface looks slightly different compared to standard tined pavement, there were no particular problems once finishers got the hang of it.



these were eased significantly by the lack of having to work around, over, and occasionally under the stringline. There were initial concerns about the ability to tine the surface given the incorporation of the fibers, but a test placement completed the prior week at D's yard proved the concerns largely unwarranted. There was no unusual difficulty finishing or tining the surface. Curing was applied immediately upon completion of the tining operations prior to jointing the pavement.

Jointing is essential on thin pavements, which are prone to curling due to temperature and hydration shrinkage stresses that have the potential to develop. Excessive curl could contribute to delamination from the underlying asphalt which could change the stress transfer characteristics of the system and create localized premature corner breaks. Controlling these stresses is primarily the reason for the extensive sawing operations used on the slab. And this is no small operation!

Given that the joints are set up in a 4-foot by 4-foot saw pattern, a little quick math will tell you that every mile of pavement built 24-foot wide requires roughly 11 miles of joint sawing every day that you are paving. Saw crews usually started about the middle of the day and worked through the afternoon, night and early into the next day to keep pace with the paving operation. It was one heck of a job and I have to hand it to Jim McClellan of Tough Cut Concrete Services, Inc. and his people for keeping the work going through the night and keeping the saw cuts straight. Early entry saws were used for most of the cutting on the project.

By the time you read about this project it will likely be complete. D Construction expects to finish the remaining portion, the southbound section, by the end of June. That section is essentially identical in geometry and structure to the already completed northbound section. Assuming weather cooperates, I would expect similar results.

If you would like more information on concrete inlay or overlay techniques for projects large or small, contact Illinois Ready Mixed Concrete Association or Illinois Chapter, Inc. – American Concrete Pavement Association. We would be happy to assist you in getting yours started. But please, let's not take 20 years to do so!

This article first appeared in the Summer 2012 issue of the IRMCA News.

Randell Riley is the Executive Director/Engineer for Illinois Chapter – ACPA, and a consultant to Illinois Ready Mixed Concrete Association. He can be reached at 217-793-4933 or pccman@ilacpa.com.

Sawing on a project like this means roughly 11 miles of walking behind the saw for every mile of pavement placed. Note the saw cut lines transversely and longitudinally.

IL Chapter's Jimie Wheeler demonstrates the "duct tape" test for an indication of the amount of surface debris that might inhibit bond. This section is in pretty good shape as it will receive one more pass with an air blast just prior to paving.

A view to the south of the overlaid northbound section of Illinois 53 in Will County.



Photo Courtesy of Lester Cheney, D Construction.

